

AF/3748

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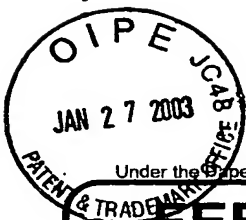
<b>TRANSMITTAL FORM</b> <i>(to be used for all correspondence after initial filing)</i>	Application Number	10/051,003
	Filing Date	01/18/2002
	First Named Inventor	Patrick C. Marks, et al
	Group Art Unit	3748
	Examiner Name	Tu M. Nguyen
Total Number of Pages in This Submission		31
Attorney Docket Number		9319

ENCLOSURES (check all that apply)		
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Signature	<i>William W. Habelt</i>
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# FEE TRANSMITTAL for FY 2003

Effective 01/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ ) 320.00

## Complete if Known

Application Number 10/051,003  
Filing Date January 18, 2002  
First Named Inventor Patrick C. Marks, et al  
Examiner Name Tu M. Nguyen  
Art Unit 3748  
Attorney Docket No. 9319

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TECHNOLOGY CENTER R37C

## METHOD OF PAYMENT (check all that apply)

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Carrier Corporation

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## FEE CALCULATION

### 1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1001	750	2001	375	Utility filing fee	
1002	330	2002	165	Design filing fee	
1003	520	2003	260	Plant filing fee	
1004	750	2004	375	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) (\$ ) 0.00

### 2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims		Extra Claims		Fee from below	Fee Paid
Independent	Multiple Dependent	-20** =	-3** =		

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1202	18	2202	9	Claims in excess of 20	
1201	84	2201	42	Independent claims in excess of 3	
1203	280	2203	140	Multiple dependent claim, if not paid	
1204	84	2204	42	** Reissue independent claims over original patent	
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) (\$ ) 0.00

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Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for <i>ex parte</i> reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	410	2252	205	Extension for reply within second month	
1253	930	2253	465	Extension for reply within third month	
1254	1,450	2254	725	Extension for reply within fourth month	
1255	1,970	2255	985	Extension for reply within fifth month	
1401	320	2401	160	Notice of Appeal	
1402	320	2402	160	Filing a brief in support of an appeal	320.00
1403	280	2403	140	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,300	2453	650	Petition to revive - unintentional	
1501	1,300	2501	650	Utility issue fee (or reissue)	
1502	470	2502	235	Design issue fee	
1503	630	2503	315	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	750	2809	375	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	750	2810	375	For each additional invention to be examined (37 CFR 1.129(b))	
1801	750	2801	375	Request for Continued Examination (RCE)	
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Other fee (specify) \_\_\_\_\_

\*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$ ) 320.00

## SUBMITTED BY

(Complete if applicable)

Name (Print/Type) William W. Habelt  
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Signature *William W. Habelt*  
Date 01/16/2003

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## DESCRIPTION OF ARTICLES OR SERVICES TO BE FURNISHED

FOR FILING AN APPEAL BRIEF OF PATRICK C. MARKS ET AL.

SERIAL NO. 10/051,003

FILED: JANUARY 18, 2002

FOR: MULTIPLE FREQUENCY HELMHOLTZ RESONATOR

Fee: \$ 320.00

Total: \$720.00

Please charge any additional fees that may be required to Deposit Account No. 03-0835.

*William W. Habelt*

William W. Habelt  
Reg. No. 29,162

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TECHNOLOGY CENTER R3700



Attorney Docket No. 9319

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re	)	
Application of	)	Examiner: TU M. NGUYEN
PATRICK C. MARKS ET AL.	)	Art Unit: 3748
Serial No.: 10/051,003	)	Docket No: 9319
Filed: JANUARY 18, 2002	)	
For: <b>MULTIPLE FREQUENCY</b>	)	
<b>HELMHOLTZ RESONATOR</b>	)	

APPEAL BRIEF

Syracuse, New York

January 9, 2003

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Assistant Commissioner of Patents  
Washington, DC 20231

JAN 30 2003  
TECHNOLOGY CENTER R3700

Sir:

This is an Appeal from the Examiner of Group Art Unit 3748 refusing claims 1, 3, 5, 7, 9 and 11.

REAL PARTY IN INTEREST

The real party in interest is Carrier Corporation and the assignment thereto is recorded in the United States Patent and Trademark Office at Reel 012651, starting at Frame 0897.

RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Applicants' legal representative or assignee which will directly offset or be directly affected by or have a bearing on the Board's decision in the pending Appeal.

### **STATUS OF THE CLAIMS**

Claims 1, 3, 5, 7, 9 and 11 stand finally rejected. Claims 2, 4, 6, 8, 10 and 12 stand objected to as being dependent upon a rejected base claim.

### **STATUS OF THE AMENDMENTS**

An Amendment After Final Rejection specifically required by the Examiner was made to claim 9 but was denied entry in that it is "not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal."

### **SUMMARY OF THE INVENTION**

The present invention is directed to a multiple frequency response Helmholtz resonator (50; 150; 250) for use with a multi-speed engine (20) system (100) to achieve noise attenuation at different engine operating speeds. In the Background of the Invention the noise problem associated with a plurality of parked refrigeration units is discussed. As stated at page 1, lines 22-24, "(i)n a Helmholtz resonator you have a chamber/volume (50-A, 50-B; 150-A; 250-A, 250-B) configured as a dead end side branch to a duct and connected to the duct by a passage/neck (50-1; 150-1, 150-2, 150-3; 150-1, 250-2, 250-3) that is substantially smaller in cross section." The present invention modifies the volume and/or the neck area of a single Helmholtz resonator to change the frequency range to which the resonator is responsive. The frequency response of the Helmholtz resonator is changed responsive to changes in the speed of the engine. The changes in volume and neck area are achieved through valves (52; 152; 252, 262). The use of the term "valve" in the Specification is explained at page 4, lines 16-19 and is based on the structural similarities although there is no flow into or out of the closed chamber defining the Helmholtz resonator.

### **ISSUES**

The issue with respect to claims 1, 3, 5, 7, 9 and 11 which stand finally rejected under 35 U.S.C. § 102(b) is whether they are unpatentable over Nakachi et al.

An additional issue with respect to claim 9 is whether the objection to the claim language was proper.

**GROUPING OF THE CLAIMS**

Claims 1, 3, 5, 7, 9 and 11 do not stand or fall together. Claims 1, 5, and 9 are each independent and have different degrees of specificity in their limitations.

a) PRIOR ART RELIED ON:

NAKACHI ET AL. JAPANESE PUBLICATION 2-215925 8-1990

Nakachi et al. (Japanese Publication 2-215925) has as a stated purpose "(t)o effectively utilize intake pulsations" such that "volumetric efficiency is improved for a resonance effect" and "intake pulsation is effectively utilized over the whole area of operating ranges, whereby the volumetric efficiency is increased and, a charging air quantity is also increased" and "(e)ngine power can be improved". There is no mention of attenuating noise or of the disclosed structure functioning as a Helmholtz resonator. It appears that the disclosed structure improves engine power by regulating the air supplied via the intake pulsations and that flow into and out of the branch line is responsive to changes in pressure due to the pulsations. Structurally, Nakachi et al. discloses an intake pipe 5 which is connected to a branch serially including pipe 10 containing valve 13, volume 7, pipe 11 containing valve 14, volume 8, pipe 12 containing valve 15, and volume 9. The "constitution" states that "(v)alves 13-15 ... are opened or closed via a controller 16" and that "these valves are closed in order of 15, 14, and 13". It follows that opening and closing of valves 13-15 controls the number of volumes connected to intake pipe 5 but does not regulate the size of the individual volumes or the cross sectional areas in the paths defined by pipes 10, 11 and 12 so as to tune a particular volume.

b) CENTRAL ISSUE:

Whether or not the reference discloses a Helmholtz resonator and, if so, whether or not it achieves noise attenuation in a plurality of frequencies.

c) REBUTTAL OF REJECTION:

Claims 1, 3, 5, 7, 9 and 11 stand finally rejected under 35 U.S.C. § 102(b) as anticipated by Nakachi et al. (Japanese Publication 2-215925). Independent claims 1, 5 and 9 each require the single recited resonator to be "continuously operatively connected to said inlet line via a restricted connection" (emphasis supplied). This structure corresponds to neck 50-1 in Figures 2 and 3, neck 150-1 in Figures 4-6, and neck 250-1 in Figures 7 and 8. Independent claims 1, 5, and 9 further require "means for attenuating noise in a plurality of frequencies by changing the frequency response of said Helmholtz resonator" (emphasis supplied). This structure corresponds to valve 52 in Figures 2 and 3, valve 152 in Figures 4-6 and valves 252 and 262 in figures 7 and 8. Claim 5 differs from claim 1 in reciting a refrigeration system and microprocessor means. Claim 9 differs from claims 1 and 5 in reciting details of the closed chamber and the recitation of a valve.

As noted above in the discussion of Nakachi et al, there is no mention of attenuating noise or of the disclosed structure functioning as a Helmholtz resonator.

Assuming, arguendo, that the Nakachi et al device does attenuate noise it still fails to meet the claim limitations noted above.

The Examiner has read the reference against claim 1 with volume 9 read as the closed chamber which defines a Helmholtz resonator which is "continuously operatively connected to said inlet line via a restricted connection" (emphasis supplied). The Examiner reads pipe 12 as the restricted connection and notes in the Advisory Action that "(i)n an operational view point, volume (9) of Nakachi et al is operated continuously (even when the valve (15) is closed) to attenuate engine noise." The

structure corresponding to "means for attenuating noise in a plurality of frequencies by changing the frequency response of said Helmholtz resonator" is read as valve 15. There is a single fluid path between intake pipe 5 and chamber 9 with valves 13, 14 and 15 being therebetween. Since valves 13, 14 and 15 are opened and closed during normal operation with valve 15 being the first closed and the last opened, volume 9 cannot be considered "continuously operatively connected to said inlet line via a restricted connection" (emphasis supplied) since when valve 14 is closed, opening or closing valve 15 would have no effect. Further, valve 15 can only connect or disconnect volume 9 with inlet line 5 which equates to the resonator being on or off, so it does not have a changed frequency response. Even if volumes 7, 8 and 9 do act as Helmholtz resonators, valves 13, 14 and 15 only connect or disconnect the volumes to inlet line 5. There is no showing of the changing of the volumes of chambers 7, 8 and 9 or of changing the cross sectional area of pipes 10, 11 and 12 as would be required to change the frequency response of a single Helmholtz resonator as is required by claim 1.

The Examiner has read the reference against claims 5 and 9. In reading the reference against the claims volumetric part 9 is read as the "closed chamber" which defines a Helmholtz resonator which is "continuously operatively connected to said inlet line via a restricted connection" (emphasis supplied). The Examiner reads pipe 12 as the restricted connection and notes in the Advisory Action that "(i)n an operational view point, volume (9) of Nakachi et al is operated continuously (even when the valve (15) is closed) to attenuate engine noise." The structure corresponding to "means for attenuating noise in a plurality of frequencies by changing the frequency response of said Helmholtz resonator" is read as valve 15. Valve 15 only has an open and a closed position. As noted above with respect to claim 1, volume 9 is not "continuously operatively connected to said inlet line via a restricted connection" (emphasis supplied) since when valve 14 is closed opening or closing valve 15 would have no effect. Valve 15 can only connect or disconnect volume 9 with inlet line 5 which equates to the resonator being on or off, so it does not have a changed frequency response. There is no showing of the changing of the volumes of chambers 7, 8 and 9 or of changing the

cross section of pipes 10, 11 and 12 as would be required to change the frequency response of a single Helmholtz resonator as required by claims 5 and 9.

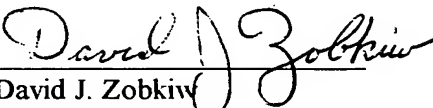
Dependent claims 3, 7 and 11 require in addition to the "restricted connection" between the Helmholtz resonator and the inlet line that "said means for changing the frequency response includes at least one restricted connection which is selectively connected between said chamber and said inlet line". Because the claims require two restricted connections and this is not shown in the reference, these claims further define over the reference.

The final rejection objected to language in claim 9 and required a specific correction. An Amendment was submitted making the required correction but it was denied entry without withdrawing the objection. In response to the outstanding objection, I note first that the requirement for placing "and" after the antepenultimate subparagraph rather than after the penultimate subparagraph in contrary to normal usage where "and" normally goes immediately before the last item in a series. The requirement for placing "wherein" as the first word of the last subparagraph is arbitrary and does nothing to clarify the claim language. It is believed that the objection was improper and should have been withdrawn.

In summary, it is believed that Nakachi et al. does not disclose a Helmholtz resonator or noise attenuation as required by the claims. Even if the volumes 7, 8 and 9 do function as Helmholtz resonators, they are only turned on and off. They do not change their frequency response as to a single volume as by changing the volume or the cross sectional area of the restriction as would be required to meet the claim limitations.

It is therefore believed that finally rejected claims 1, 3, 5, 7, 9 and 11 define patentable novelty over the reference of record and that the rejection thereof, accordingly, should be reversed.

Respectfully submitted,  
PATRICK C. MARKS ET AL.



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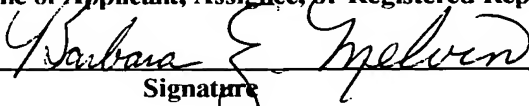
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Carrier Corporation

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**Signature**

January 16, 2003

**Date of Signature**

**APPENDIX**

1. In a system having a multi-speed engine with an air inlet line connected to said engine, a Helmholtz resonator structure comprising:  
a closed chamber configured as a single dead end side branch connected to said line and defining a Helmholtz resonator continuously operatively connected to said inlet line via a restricted connection; and

means for attenuating noise in a plurality of frequencies by changing the frequency response of said Helmholtz resonator responsive to changes in speed of said engine.

3. The Helmholtz resonator of claim 1 wherein said means for changing the frequency response includes at least one restricted connection which is selectively connected between said chamber and said inlet line.

5. A refrigeration system having a multi-speed engine with an inlet line connected to said engine, microprocessor means for controlling the speed of said engine, the improvement comprising:

a closed chamber configured as a single dead end side branch connected to said line and defining a Helmholtz resonator continuously operatively connected to said inlet line via a restricted connection; and

means for attenuating noise in a plurality of frequencies by changing the frequency response of said Helmholtz resonator responsive to changes in speed of said engine.

7. The Helmholtz resonator of claim 5 wherein said means for changing the frequency response includes at least one restricted connection which is selectively connected between said chamber and said inlet line.

9. A refrigeration system having a multi-speed engine with an inlet line connected to said engine, microprocessor means for controlling the speed of said engine, the improvement comprising:

a closed chamber configured as a single dead end side branch connected to said line and defining a Helmholtz resonator continuously operatively connected to said inlet line via a restricted connection;

means for attenuating noise in a plurality of frequencies by changing the frequency response of said Helmholtz resonator responsive to changes in speed of said engine; and

said means for changing the frequency includes a valve having only an open and a closed position.

11. The Helmholtz resonator of claim 9 wherein said means for changing the frequency response includes at least one restricted connection which is selectively connected between said chamber and said inlet line.